

Flow instability of dope solution in hollow fiber spinning process for different flow channel length

Abstract

The study demonstrated the effect of different flow channel length on the spinneret with respect to the ceramic hollow fiber membrane morphology. A smartly designed spinneret is utilized for the spinning process where the nozzle used can be change to different length via the use of adapters. Thus, allowing the effect of having different flow channel length to be investigated. Three spinneret adapters with different nozzle length were fabricated at 29 mm, 34 mm, and 39 mm. Ceramic hollow fiber membrane is produced using these configurations in the spinning process. Then, the micrographic cross sections of hollow fiber membranes is investigated using Scanning Electron Microscope (SEM) where it shows finger like, dense layer and damage structure morphology. Out of the samples investigated, hollow fiber membrane spun using 39 mm nozzle length produce the best concentricity. CFD simulation is initiated to study the flow behavior inside the flow channel to correlate with that of the experimental result attained.